US009302745B2

(12) **United States Patent**
Wang

(10) **Patent No.: US 9,302,745 B2**
(45) **Date of Patent: Apr. 5, 2016**

(54) **AIRCRAFT CARRIER REPLENISHMENT SYSTEM DESIGNED TO TRANSPORT CARGO USING CONTAINERS AND OIL TANKS**

(71) Applicant: **Wei Wang**, Jiangxi (CN)

(72) Inventor: **Wei Wang**, Jiangxi (CN)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 25 days.

(21) Appl. No.: **14/359,206**

(22) PCT Filed: **Nov. 7, 2012**

(86) PCT No.: **PCT/CN2012/084255**
§ 371 (c)(1),
(2) Date: **May 19, 2014**

(87) PCT Pub. No.: **WO2013/071832**
PCT Pub. Date: **May 23, 2013**

(65) **Prior Publication Data**

US 2014/0321951 A1 Oct. 30, 2014

(30) **Foreign Application Priority Data**

Nov. 19, 2011 (CN) 2011 1 0368794

(51) **Int. Cl.**
B63B 25/00 (2006.01)
B63B 27/10 (2006.01)
B63B 27/00 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***B63B 27/30*** (2013.01); ***B63B 25/004*** (2013.01); ***B63B 27/10*** (2013.01); ***B63B 35/50*** (2013.01)

(58) **Field of Classification Search**
CPC B63B 27/10; B63B 27/12; B63B 25/004; B63B 19/08; B63B 27/16; B63B 27/30; B63B 27/36
USPC 114/258, 259, 260, 261; 212/312; 414/137.9, 140.1, 141.5, 142.8, 142.9, 414/564
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,363,797 A * 11/1944 Lovfald B63B 25/002 114/72
2,541,893 A * 2/1951 Speer B63B 27/10 114/375

(Continued)

FOREIGN PATENT DOCUMENTS

CN 201065285 5/2008
CN 101508328 8/2009

(Continued)

OTHER PUBLICATIONS

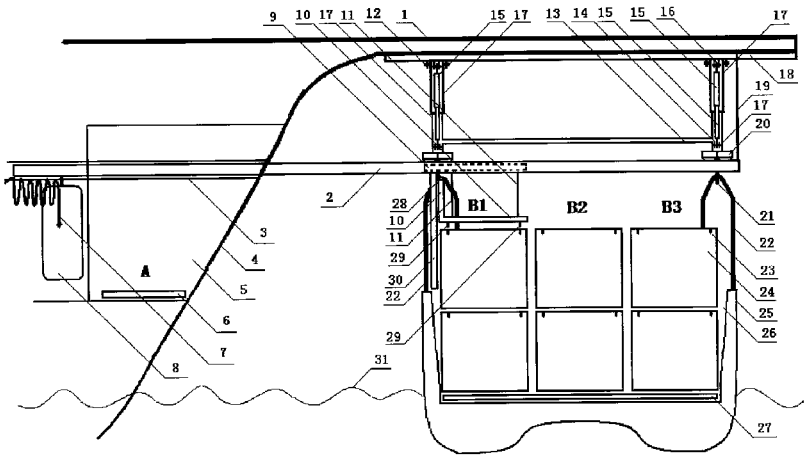
International Search Report for corresponding application PCT/CN2012/084255 file Nov. 7, 2012; Mail date Jan. 31, 2013.

Primary Examiner — Gregory Adams
(74) *Attorney, Agent, or Firm* — Cantor Colburn LLP

(57) **ABSTRACT**

An aircraft carrier replenishment system conveying goods using containers and oil tanks is disclosed. Two sides of the main body of each of an aircraft carrier and a replenishment ship are each provided with a loading window. The window at one side is a container loading window, and a container crane is provided in the window. The window at the other side is an oil loading window, and an operation room for connecting an oil delivery pipe is provided in the window. A marine crane for hoisting transport and oil travel between the aircraft and the replenishment ship. A network communication system is providing for connecting the aircraft carrier, the replenishment ship and the transport ships.

4 Claims, 5 Drawing Sheets



(51) **Int. Cl.**
B63B 27/30 (2006.01)
B63B 35/50 (2006.01)

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,988,036	A *	6/1961	Mooneyhan	B63B 25/006 114/260
3,165,211	A *	1/1965	Ablett	B63B 27/00 114/85
3,207,329	A *	9/1965	Bevard	B63B 27/10 212/322
3,220,571	A *	11/1965	Kummerman	B63B 27/12 414/141.5
3,498,477	A *	3/1970	Sommer	B63B 27/12 114/201 R
3,528,527	A *	9/1970	Gregory	B66C 13/02 187/253
3,946,881	A *	3/1976	Ludvigsen	B66C 13/10 212/299
4,043,285	A *	8/1977	Nordstrom	B63B 25/004 114/72
4,552,082	A	11/1985	Grey	
6,842,665	B2 *	1/2005	Karlen	B63B 25/22 108/51.11
7,815,031	B2 *	10/2010	Schneider	B63B 25/004 198/347.1

FOREIGN PATENT DOCUMENTS

GB	2087342	A *	5/1982	B63B 27/16
JP	52001882	A *	1/1977	
JP	55068493	A *	5/1980	
JP	57057132	A *	4/1982	
JP	58177827	A *	10/1983	
KR	WO 2011019121	A1 *	2/2011	B63B 27/12
NO	WO 2012008846	A1 *	1/2012	B60L 11/18

* cited by examiner

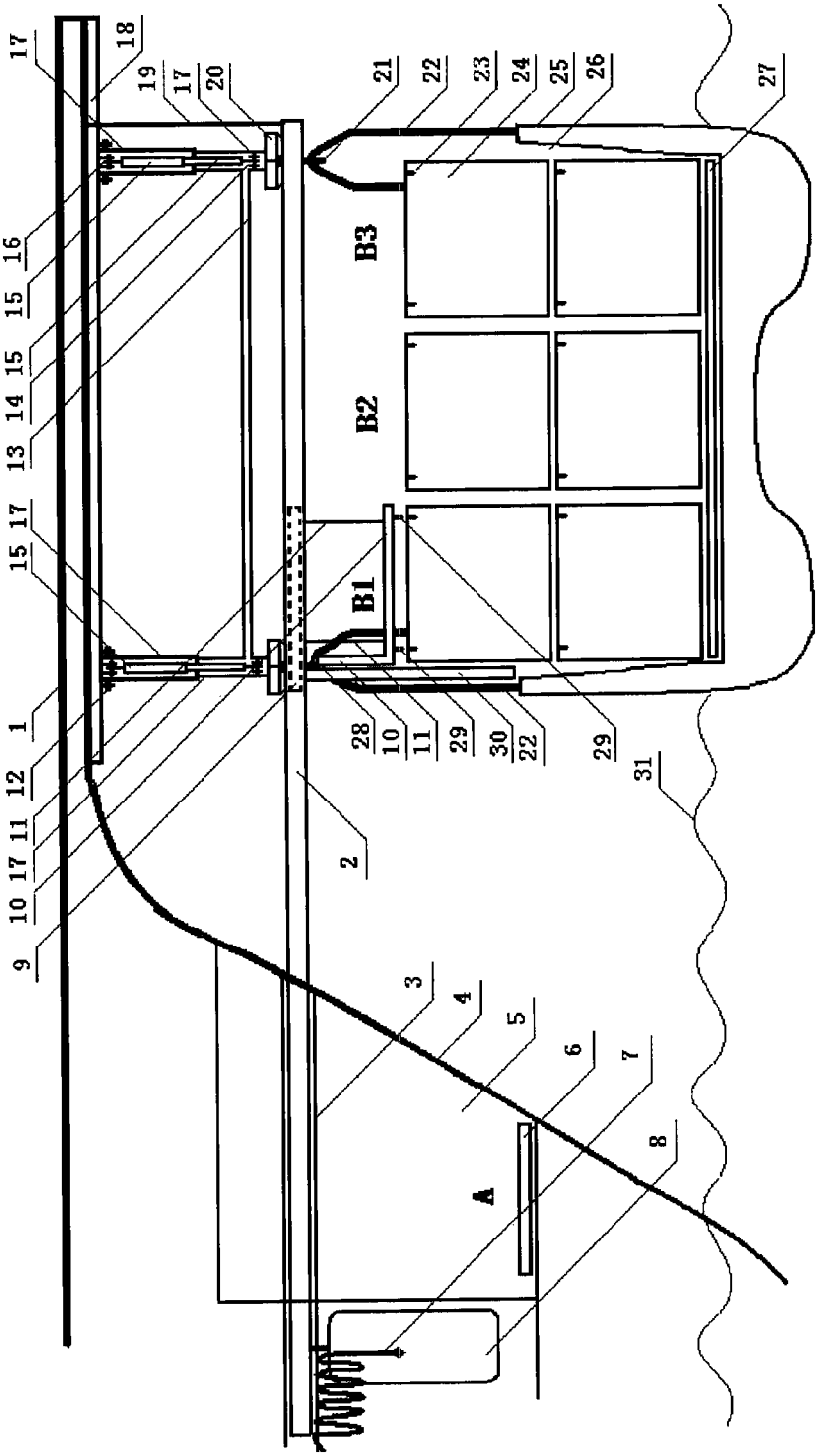


Fig. 1

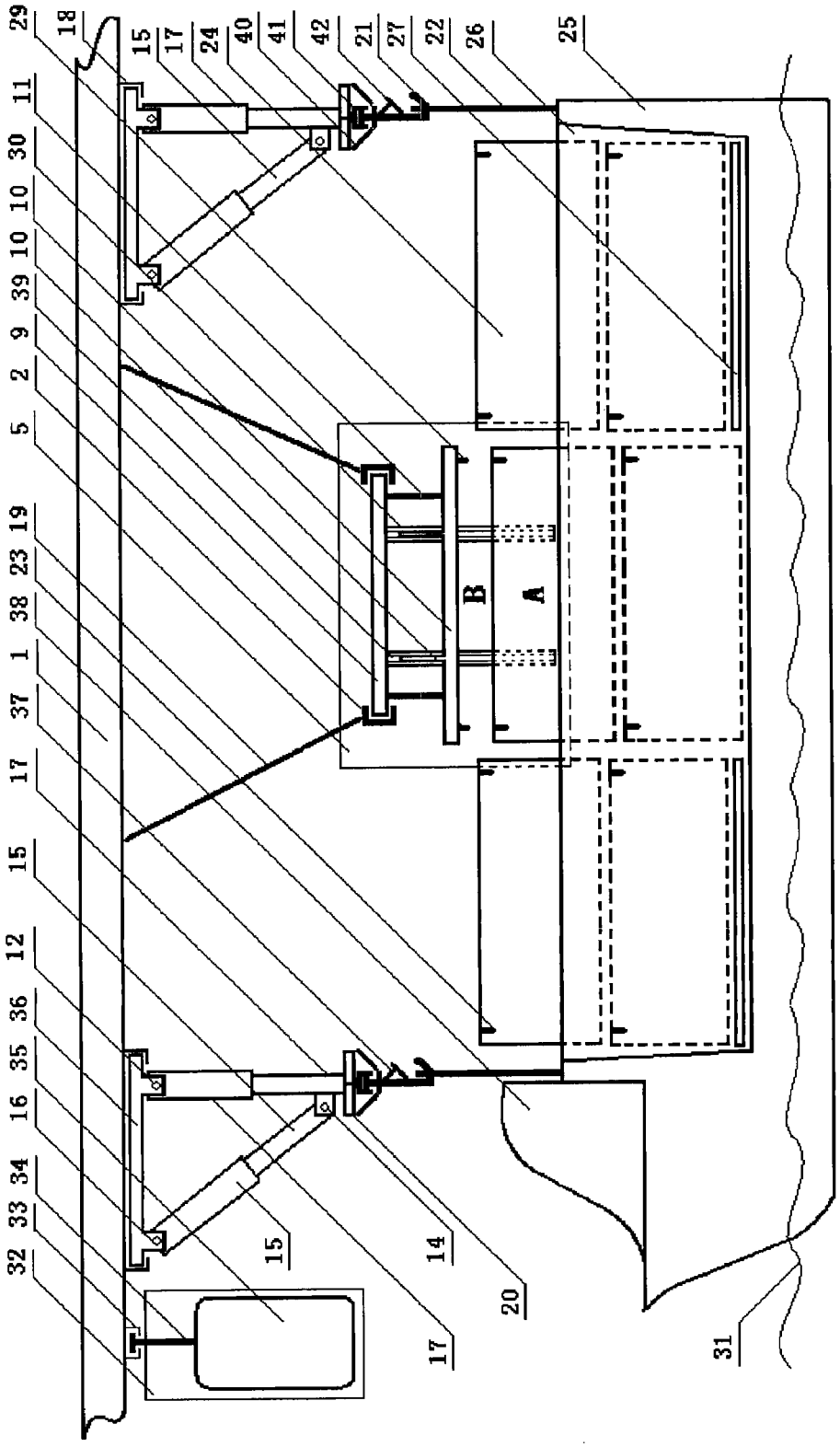

29
18
15
17
24
40
41
42
21
27
22
26
25
11
30
10
10
39
9
2
5
19
23
38
1
37
17
15
12
36
35
16
34
33
32
B
A
15
14
20
17
31

Fig.2

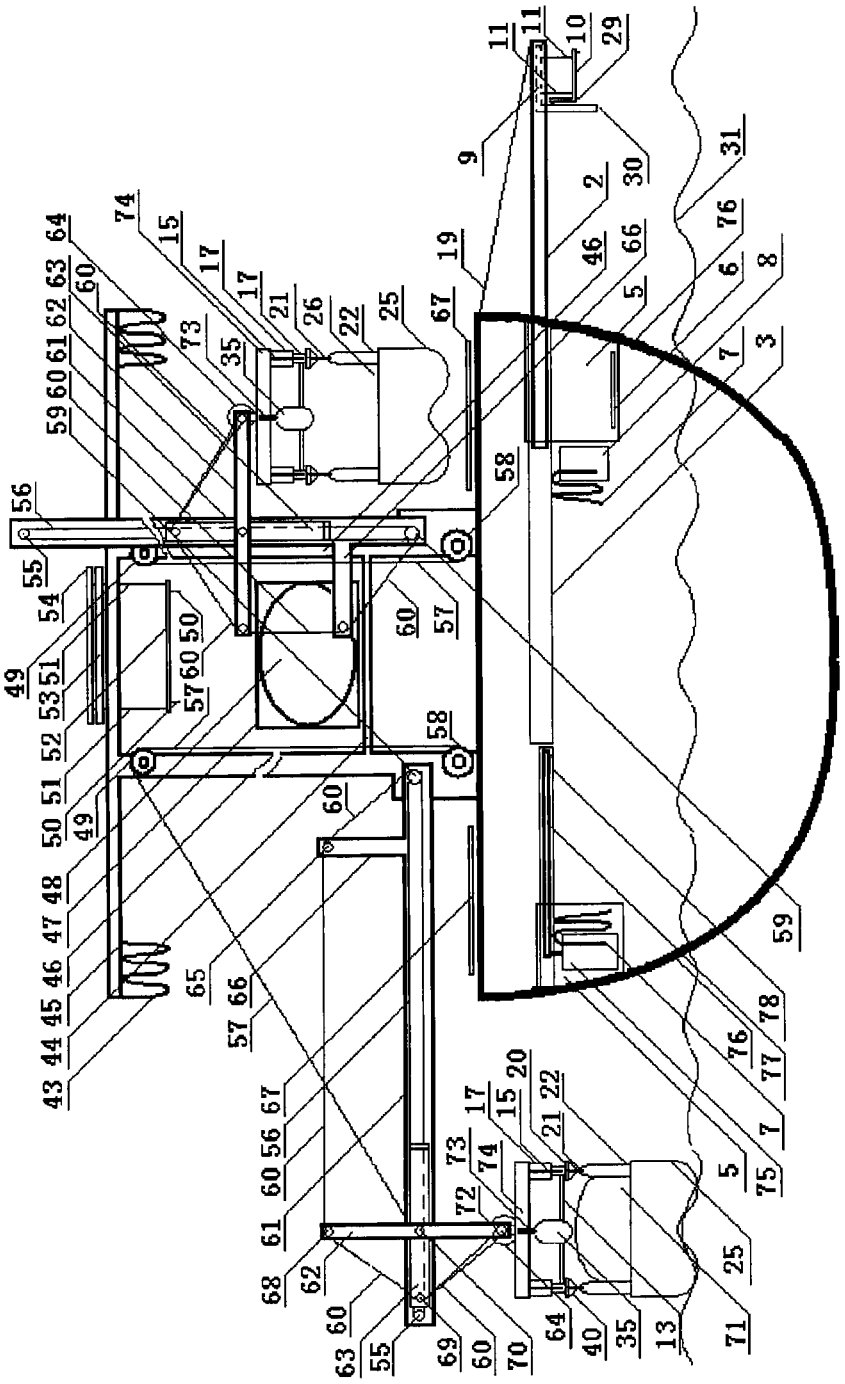


Fig.3

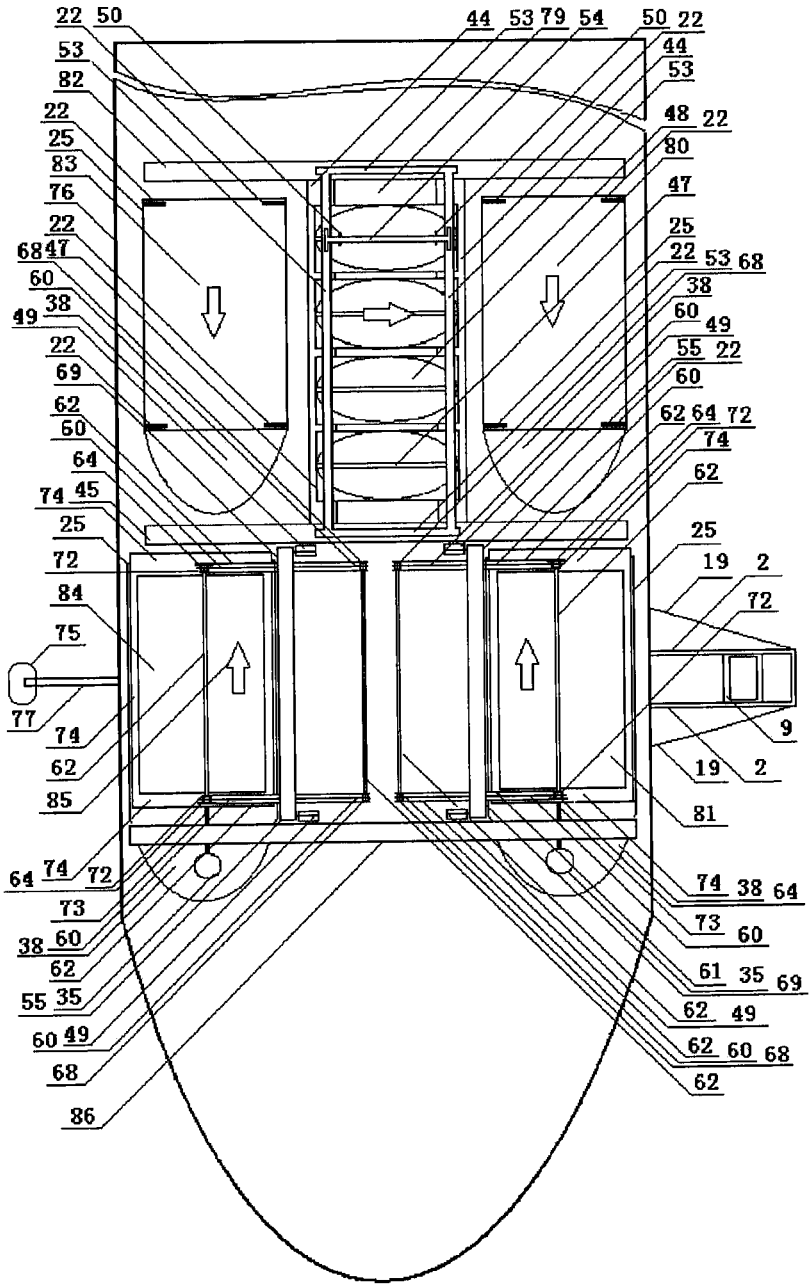

22 50
44 53 79 54
50 22
53
82
22
25
83
76
22
68 47
60
49 38
22
69
62
50
64
74 45
25
72
84
75
77
74
62
85
64 74 72
73
38 60
62
55 35
60 49
68
86
44
53
48 22
80
47
25
22 53 68
38
60 49
55 22
60
62 64 72
74
62
25
19 2
72
9
19 2
81
74 38 64
73 60
61 35 69
62 49
62 60 68
62

Fig.4

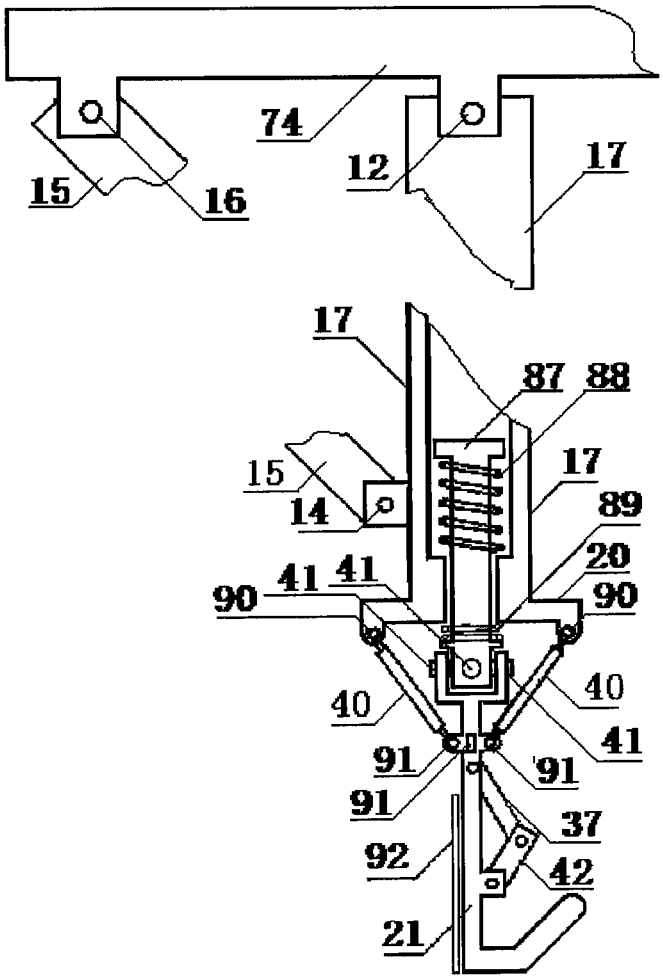

74
12
17
15
16
17
87
88
17
15
89
14
20
41
41
90
90
40
40
41
91
91
91
37
92
42
21

Fig.5

AIRCRAFT CARRIER REPLENISHMENT SYSTEM DESIGNED TO TRANSPORT CARGO USING CONTAINERS AND OIL TANKS

TECHNICAL FIELD OF THE INVENTION

The invention is a systematic device that can move supplies and ammunition from a replenishment oiler to an aircraft carrier in this way of loading, unloading and transport.

BACKGROUND OF THE INVENTION

Exiting aircraft carrier has to stop fighting when it is replenished its supplies and ammunition of consumption. It has to connect with replenishment oiler to transport supplies and ammunition by mooring rope when it is in its state of voyage. If the fighting is still continuing, another aircraft carrier has to take the fighting and protect the aircraft carrier that is being replenished. Existing aircraft carriers are all replenished by this way and device.

SUMMARY OF THE INVENTION

To overcome the defect illustrated above, a kind of aircraft carrier replenishment system designed to transport cargo using containers and oil tanks. The systems have a loading and unloading port in the each sidewall of the replenishment oiler and aircraft carrier. In the course of replenishment, containers with supplies will be in turn moved to cabin of cargo carrier parking in the sea beside the loading and unloading port from the container loading and unloading port of the replenishment oiler. And then, the cargo carrier will transport the containers to the container loading and unloading port of the aircraft carrier to in turn lift up those containers into the container loading and unloading port; or to load and unload the oil for the cargo carrier with one to three oil tanks in the cabin on the side of the container loading and unloading port of the replenishment oiler and aircraft carrier; on the other side of the replenishment oiler and aircraft carrier is an oil loading and unloading port, specialized for the cargo carrier's cabin is a fixed oil tank for loading and unloading the oil; the loading and unloading of the oil is to connect the oil transport pipe in the loading and unloading port with the oil tank in the cargo carrier; on the two sides of the aircraft carrier and replenishment oiler, the loading and unloading port can load and unload the oil at the same time for the fixed oil tank of cargo carrier too; to transport the empty containers in the aircraft carrier back to the replenishment oiler is to in turn lift down the empty containers from the container loading and unloading port of the aircraft carrier to cabin in cargo carrier parking in the sea and then the cargo carrier will transport the empty containers to the side of the replenishment oiler and in turn move these empty containers to the container loading/unloading port of the replenishment oiler; only when the cargo carrier in the sea is fixed by the marine crane of the replenishment oiler and by the marine lifting unit of the aircraft carrier, the containers and oil are loaded and unloaded between the replenishment oiler and the cargo carrier, and between the cargo carrier and aircraft carrier. There are many cargo carriers between the replenishment oiler and the aircraft carrier to accomplish the transportation of the cargo and empty containers. One cargo carrier can stand 200 tons to 400 tons of solid cargo or oil at a time, and the cabin is a fixed oil tank cargo carrier used to load huge amount of aircraft fuel oil. The moving oil tank is respectively used to load less

demanding oil species, or it can also load both the moving oil tank and container in one cargo carrier.

The above goal is to be reached in this way: First, loading and unloading ports **5** in sidewalls **4** of the aircraft carrier and in sidewalls **76** of the replenishment oiler, the ports on one side of the aircraft carrier and the replenishment oiler are the container loading and unloading ports **5**, which are used to load and unload containers **24** and oils, and the ports on the other side of the aircraft carrier and the replenishment oiler are the oil loading and unloading ports **5** which is used to load and unload oils specially. Inside the container loading and unloading ports **5**, there is a container crane used to load and unload containers which can move and arrive at the outside the container loading and unloading port **5** along a runway **3**, and a first operator's cab **8** used to load and unload oils which hung to the container crane to the outside of the loading and unloading port **5**, inside the container loading and unloading ports **5**, there is a second operator's cab **75** hung on an outer side of a crane arm **77** which can move along a runway **78**. Second, on each sides of the aircraft carrier, there is respectively a marine lifting unit, which is beneath the aircraft carrier's deck **1** above the outside of the loading/unloading port **5** of the aircraft carrier, the marine lifting units are used to hang and secure the cargo carrier **25** in the sea; on the left side and the right side of a gantry's column of a replenishment oiler's first gantry **86** and a second gantry **45**, there is respectively a marine crane to hang and secure the cargo carrier **25** in the sea and to move the empty cargo carrier **25** from/to the sea to/from a first position **81** or a second position **84** on the replenishment oiler's deck. Three, there are four cargo carriers **25** shuttling between the aircraft carrier and the replenishment oiler to transport cargo, three of the four cargo carriers **25** have cabins **26** for fixed tank **71** which are dedicated to transporting oils. One of the four cargo carriers **25** includes cabin **26** which is suitable to carry three oil tanks **48** or carry 2 or 3 layers of the containers **24** placed up and down, the containers of each layer are arranged in three rows from left to right and in three lines from front to back. Forth, there is a control cab **35** in front of the marine lifting unit, and a control cab **35** in front of the gantry **74** on the marine crane; the control cab **35** can be used to lift the cargo carrier **25** using the marine lifting units or the marine cranes. Fifth, for facilitation of the operators' talking, data transmission, video monitoring and control right transfer, the loading and unloading ports **5**, the first operator's cab **8**, the second operator's cab **75**, the control cab **35** of the aircraft carrier and the replenishment oiler and driving cab **38** are equipped with network communication devices.

The container crane comprises a crane arm **2**, a trolley **9** and a sling **10**, the crane arm **2** can move along a runway **3** from the inside the loading/unloading port **5** to the outside the loading/unloading port **5** to arrive over the cargo carrier **25** lifted by the marine lifting units and the marine cranes, the trolley **9** which lifts a container runs on the crane arm **2**, the trolley **9** lifts the sling **10** by four fourth wire ropes **11** which are driven by windlasses, there are two downward guides **30** inside the trolley **9**, and there is a runway **39** on each of the two guides **30**, at top of the slings **10**, there are two slide blocks **28** which are embedded in the two runways **39** respectively, the slings **10** run along the runway **39** up and down; when containers **24** are lifted from slide board **6** on the loading/unloading position A and from cargo carrier **25** on the loading/unloading position B lifted by the marine lifting units or the marine cranes, the trolley **9** runs on the crane arm **2** to the loading/unloading position A or the loading/unloading position B, after it, the slings **10** move guided by the guide **30** at the loading/unloading position A or the loading/unloading

position B1 B2 B3 to fit a spin lock **29** into a lock hole **23** in the container **24** precisely. When the spin lock **29** fits into the lock hole **23**, the slings **10** will lift up the containers **24**. the container crane carries the container **24** and transports the container **24** between the slide board **6** on the loading/unloading position A inside the loading/unloading port **5** and the cabin **26** of cargo carrier **25** secured to the loading/unloading position B. Inside the loading/unloading port **5**, a plurality of carrying boards can slide forward and backward to move the containers **24** from the loading/unloading position A to a cabin of the aircraft carrier and replenishment oiler, or to move the containers **24** from a cabin of the aircraft carrier and replenishment oiler to the loading/unloading position A.

The first operator's cab **8** and the second operator's cab **75** can approach a side of the cargo carrier **25** lifted by the marine lifting units or the marine cranes and connect an oil pipe **7** in the loading/unloading port **5** of the aircraft carrier and the replenishment oiler to the oil tank **48** or to the oil tank **71** of the cargo carrier **25** to load/unload oils.

Each marine lifting unit or marine crane has four hydraulic arms, there is a hook **21** at the lowest end of the each hydraulic arms. a marine lifting unit has two slide frames **36** and two runways **18**, the slide frame **36** is driven inward/outward along the runway **18**, there are two hydraulic arms beneath the slide frame **36** which is in front, there are two hydraulic arms beneath the latter slide frame **36**, the distance between the two hydraulic arms's hooks **21** beneath the same slide frame **36** and the distance between the two rings **22** in the right and left at the cargo carrier **25** are equal. The distances between the two hooks **21** of the hydraulic arms on the front and rear slide frame **36** is equal to the distance between the two rings **22** front and rear at the cargo carrier **25**; The four hooks **21** are used to catch four rings **22** on the cabin **26**'s four corners of cargo carrier **25** and hung and secured the cargo carrier **25**.

Each of marine crane's four hydraulic arms is provided under each of the four corners of the gantry **74**, the four hydraulic arms form a rectangle the distances between four hooks **21** at ends of the four hydraulic arms are equal to the distances between four lift rings **22** at four corners of the cabin **26**.

Each of the four hydraulic arms has two hydraulic cylinders, cylinder **15** and cylinder **17**, the hydraulic cylinder **17** is in the back, its upper end is connected with the joint axle **12** under the slide frame **36** and gantry **74**, its bottom is a square plate **20**, it connects the hooks **21** by a cardan joint **41** under the square plate **20**, the mouth of the hooks **21** is backward; the hydraulic cylinder **15** is in the front, its upper end is connected with the joint axle **16** under the slide frame **36** and the gantry **74**, its lower end is connected with the joint axle **14** at the front of the hydraulic cylinder **17**; the end of two hydraulic cylinder **17** at the same line is connected and fixed by stick **13**. The hydraulic cylinder **17** and the hydraulic cylinder **15** work together to move the hook **21** forward, backward, upward and downward to hook rings **22** and rise and fall the cargo carrier **25**. There is a lock bar **42** at the mouth of the each hook **21**, the lock bar **42** driven by a hydraulic cylinder **37** can lock the ring **22** be hanging hook **21**.

Around the square plate **20**, there are four tension springs **40** which connect the hook **21** at one end, the tension springs **40** are used to absorb horizontal and vertical impacts on the hook **21** during lifting of the ring **22**; there are a first compression spring **88** and a second compression spring **89** between the square plate **20** and the cardan joint **41** to absorb vertical impacts on the hook **21** produced by the ring **22**.

Each marine crane also comprises a gantry frame arm **61**, a frame **62**, a slide frame **63**, a gantry **74**, a first windlass **58**, a second windlass **59**, a first wire rope **56**, a second wire rope **57**, a third wire rope **60**, a first pulley **55**, a second pulley **65**, a third pulley **49**, a fourth pulley **68**, a fifth pulley **69** and a sixth pulley **72**.

In the each of the four gantry's columns of the replenishment oiler's first gantry **86** and second gantry **45**, there is a first windlass **58**, two first windlasses **58** on the same side are fixed on the same shaft, driven by the same motor; the gantry frame arm **61** of marine cranes sway around the shaft of the second windlass **59** between the highest and lowest position as a supine position make by the self gravity of the marine cranes on both sides of the replenishment oiler and the first windlass **58**'s pulling the second wire rope **57** which round the third pulley **49**. In one gantry frame arm **61**, there have two second windlasses **59** in tandem and is fixed on the same shaft, driven by the same motor two first wire ropes **56** front and rear winds around the first pulley **55** and the second windlass **59** plural times and connects to one point on the second windlass **59** and then connects to the inner end and the outer end of the slide frame **63** respectively to form a closed cycle. The slide frame **63**'s two front and rear frame bars are in front and rear frame bars' medial grooves of the gantry frame arm **61**, the slide frame **63** is pulled by the first wire rope **56** and driven by the second windlass **59**, and the slide frame **63** driven by the first wire rope **56** can slide in a front bar and a rear frame bar of the gantry frame arm **61**. The line between the fourth pulley **68** and the second pulley **65** and the line between the first pulley **55** and the second windlass **59** are parallel. The frame **62** and the slide frame **63** are tied together by a shaft **70** into a cross shape movable connection, the front and rear two third wire ropes **60** round the second windlass **59** several times in the same way and the end is fixed on the second windlass **59**. Starting from the second windlass **59**, the another end of the third wire rope **60** winds around the second pulley **65**, the fourth pulley **68**, the fifth pulley **69**, and the sixth pulley **72**, returns back and winds around the fifth pulley **69**, then are fixed to a shaft of the fourth pulley **68**, the third wire rope **60** ties two ends of the shaft of the sixth pulley **72** so to reduce bending moment on the frame **62** which produced by the weight of cargo loaded on gantry **74**. The fifth pulley **69** is the double pulleys. The third wire rope **60** is driven by the second windlass **59** and can stretch in equal length with the first wire rope **56**. The second windlass **59** drags the first wire rope **56** when rotating in one direction, driving slide frame **63** and frame **62** slide inward, making the third wire rope **60** and the first wire rope **56** stretch synchronously; the second windlass **59** drags the first wire rope **56** when rotating in adverse direction, the first wire rope **56** slides outward around the first pulley **55** with slide frame **63** and frame **62**. Frame **62** pulls the third wire rope **60** and the first wire rope **56** to stretch synchronously. The inside and outside bar of frame **62** are respectively the fourth pulley **68** and the sixth pulley **72**'s shafts. The outside bar of slide frame **63** is the fifth pulley's shaft. Gantry **74**'s central axis in front and rear direction is fastened into movable connection by outside aciform frame bar of frame **62**. Gantry **74** can swing around the shaft of the sixth pulley **72**. There is a brake **64** between the gantry **74** and the frame **62** to prevent the gantry **74**'s continue swinging motions relative to the frame **62**, the brake **64** rotates around the shaft of the sixth pulley **72**, and its braking disc is fixed on the gantry **74**, and its braking caliper is fixed on the frame **62**. **73** is the suspender between the gantry **74** and the control cab **35**.

There is respectively a standing ring **22** at four corners of the cabin **26** of cargo carrier **25**, at the bottom of the cabin **26**, there are two second carrying boards **27** for moving the con-

tainers **24** from the loading/unloading position B at the central part of the cabin **26** to the front part or the rear part of the cabin **26**.

The third operator's cab **35** in the aircraft carrier is lifted by the crane **34** to slide toward outside on the runway **33** and get into the window **32**. There is respectively one ship carrying board **67** on each of the two sides of the replenishment oiler's deck, the ship carrying boards **67** can transport the cargo carrier **25** between the first position **81**, the second position **84**, a third position **83**, and a fourth position **80**.

There is a shelf **44** used to store movable tanks **48** between the second gantry **45** and third gantry **82**, and between the fourth position **80** and the third position **83**, and above the shelf **44**, there is a crane **53** which is movable rightward and leftward between the second gantry **45** and the third gantry **82**, there is a trolley **54** on the crane **53**, which can move forward and backward, the trolley **54** carries two windlasses driven fifth wire ropes **51** which can lift and lower a sling **52**, and the sling **52** has two hooks **50** at the end to carry the rack **47** of the movable tank **48**, the crane **53** is used to move the empty movable tanks **48** from the shelf **44** into the cabin **26** of the cargo carrier **25** at the fourth position **80** or transport the empty movable tanks **48** from the cabin **26** of the cargo carrier **25** at the fourth position **80** to the shelf **44**.

When it is not replenishing, the empty cargo carrier **25** is put on the first position **81**, the second position **84**, the third position **83**, and the fourth position **80** of the deck on replenishment oiler. When replenishing, the marine crane on the two sides sling respectively cargo carrier **25** on the first position **81** and the second position **84** to the in sea and moves to the loading/unloading position B, but the hook **21** does not be separated with the ring **22** on cargo carrier **25**. The crane arm **2** in the container loading/unloading ports **5** reaches outward to the upper side of the cargo carrier **25**, trolley **9** and sling **10** on the first carrying board **6** of the loading/unloading position A hang the containers **24** loading cargo or ammunition one by one, move to the cabin **26** of the cargo carrier **25** on the loading/unloading position B and then put them in turn, or operations cab **8** hangs on the trolley **9** and move to the side of cargo carrier **25**, the operator in operations cab **8** connects replenishment oil pipe **7** with the movable oil tank **48** or fixed oil tank **71** to load/unload oil; the crane arm **77** in the oil loading/unloading port **5** slides on the runway **78** to make the operations cab **75** reach out to the side of the cargo carrier **25**, the operator in the operations cab **75** connects replenishment oil pipe **7** to the fixed oil tank **71** for loading/unloading oil. After finishing unloading the cargo to the cargo carrier **25**, the crane arm **2** and the crane arm **77** stretch back to the loading/unloading port **5**, the marine crane on the two sides put down the cargo carrier **25** totally and separate the hook **21** from the ring **22**, cargo carrier **25** drives back to the aircraft carrier.

Two cargo carriers **25** drive to the loading/unloading port **5** on both sides of the aircraft carrier respectively, on both sides of the aircraft carrier, the marine lifting unit's hook **21** hook the rings **22** on the corresponding position of cargo carrier **25**, and move the cargo carriers **25** to the loading/unloading position B. The crane arm **2** in the container loading/unloading port **5** reaches out the loading/unloading port **5** to arrive above cargo carrier **25**, the trolley **9** and sling **10** move to the loading/unloading position B, and transport in turn the container **24** filled with supplies or ammunition in the cabin **26** to on the first carrying board **6** at the loading/unloading position A in the loading/unloading port **5**, the first carrying board **6** moves the container **24** into the cabin of aircraft carrier which is in front or at the back of the loading/unloading port **5**. Or hang the first operator's cab **8** on the trolleys **9** and move near to the cargo carrier **25**, the operator in the first operator's cab **8** connects an oil pipe **7** to the movable oil tank **48** or the fixed oil tank **71** to unload oils, crane arm **77** in the oil loading/unloading port **5** reach out the second operator's cab **75** near to the cargo carrier **25**, the operator in the second operator's cab **75** connects an oil pipe **7** to the fixed oil tank **71** to unload oils. After unloading the container **24** in the cabin **26**, the trolley **9** and sling **10** lift up the empty container **24** in the loading/unloading port **5** to the cabin **26** one by one. After unloading the oils in the cargo carrier **25** and loading the empty containers, retract the crane arm **2** and crane arm **77** to the loading/unloading port **5**, after separate the hook **21** from lift rings **22**, two cargo carrier **25** steer to the replenishment oiler.

Ship carrying board **67** on both sides of the replenishment oiler's desk transports the empty cargo carrier **25** from fourth position **80**, third position **83** to first position **81**, second position **84** for easy marine crane hoisting.

The operator in control cab **35** and the driver in cargo carrier **25** communicate and cooperate through wireless communication to finish the operation of lifting a cargo carrier **25** by using marine lifting units and marine cranes. The operation, lifting, transporting, unloading container **24** from cabin **26** to the container loading/unloading port **5**, is finished by the communication and cooperation of the operator in container loading/unloading port **5** and the operator in control cab **35** through wired and wireless communication.

The aircraft carrier replenishment system which is equipped with container and oil tank supplies greatly improves the efficiency of a carrier battle group. The aircraft carrier and replenishment oiler with the replenishment system can also keep the lateral replenishment system by using a rope.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is the schematic diagram of the relative position of the container loading/unloading port **5** in sidewalls **4** of the aircraft carrier, marine lifting unit, the cargo carrier **25** and container **24** viewing from the front to the back.

FIG. **2** is the schematic diagram of the relative position of the container loading/unloading port **5** in sidewalls **4** of the aircraft carrier, marine lifting unit, the cargo carrier **25** and container **24** viewing from the left to the right.

FIG. **3** is the schematic diagram which marine crane hoists the cargo carrier **25** to the deck at one side of the replenishment oiler, and the marine crane hoists the cargo carrier **25** in the sea at other side of the replenishment oiler viewing from the front to the back.

FIG. **4** is the schematic diagram of the replenishment oiler, marine lifting unit, the cargo carrier **25** on the deck viewing from the top to the bottom.

FIG. **5** is the schematic diagram of marine lifting unit and the structure of the hook on the marine crane.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Example 1: as shown in FIG. **1**, FIG. **2**, FIG. **3**, FIG. **4**, stipulate the head to tail direction of aircraft carrier and the replenishment oiler as the forward and backward directions, the head of aircraft carrier is the front direction; stipulate the horizontal direction of the forward and backward direction perpendicularity as the left and right direction, face the front and stipulate the direction according to the left and right hands, the end near the hull axial is the inner side, the end away from the hull axial is the lateral side.

The position where sling **10** load and unload containers **24** in the container loading/unloading port **5** on a first carrying board **6** is loading/unloading position A. The position of loading and unloading cargo to which cargo carrier **25** hooked by marine lifting unit and marine crane is moved is loading/unloading position B, the loading/unloading position B in cabin **26** of cargo carrier **25** includes B**1**, B**2**, B**3** from inside to outside. The terminal of trolley **9** driving in inward direction is loading/unloading position A and the terminal in outward direction is B**3**. The distance and the relative height between cargo carrier **25** on loading/unloading position B and the loading/unloading port **5** are fixed. The height of loading/unloading position B is based on the stability of cargo carrier **25** on hook **21** which the impact of the buoyancy of the water and waves.

A console located within the container loading/unloading port **5** has the loading/unloading position A, B**1**, rising, falling, locking, unlocking, inward sliding and outward sliding command key. The console in the control cab **35** on the same side has the loading/unloading position A, B**1**, B**2**, B**3**, rising, falling **1**, falling **2**, locking and unlocking command key. When press respectively the command key in the loading/unloading position A, B**1**, B**2**, B**3**, the trolleys **9** on the crane arm **2** can automatically walk and accurately arrive at the loading/unloading position A, B**1**, B**2**, B**3**, corresponding to the command key; when press the rising command key, slings **10** would rise or lift the containers **24** to the highest position; when press the falling command key, the slings **10** would fall to the same position of the container **24** on the first carrying board **6**; press the falling **1** command key and make sling **10** drop down to the position of containers **24** in the first layer cabin **26**; press the falling **2** command key and make the sling **10** drop down to the loading/unloading position of the container **24** in the second layer; press the inward sliding command key and make the first carrying board **6** slide into the loading/unloading port **5**, press the outward sliding command key and make the first carrying board **6** slide into the cabin of the replenishment oiler and the aircraft carrier; press the locking and unlocking command and make the spin lock **29** locks and unlocks in the lock hole **23**.

A container loading/unloading port **5** and the first operator's cab **8** within the container loading/unloading port **5** is operated by an operator. The operator is responsible for operating the container crane to rising, and falling the container **24** at the loading/unloading position A, and operate the first carrying board **6** to move the container **24** from the loading/unloading position A to the cabin or from the cabin to the loading/unloading position A, take and operate the first operator's cab **8** moving to the cargo carrier **25** and connect the oil pipe **7** to the oil tank **48** and the oil tank **71**; there is an operator within every the second operator's cab **75** and the operator is responsible for take and operate the second operator's cab **75** to move to the cargo carrier **25** and to connect the oil pipe **7** to the oil tank **71**; there is an operator within every the third operator's cab **35**, the operator is responsible for catching the cargo carrier **25** through the marine lifting unit or marine crane, the operator in the third operator's cab **35** of the container loading/unloading port **5** is responsible for the job of operating the container crane to rising and falling the container **24** at the loading/unloading position B, and responsible for the job of the trolleys **9** on the crane **2** moving from the loading/unloading position A to the loading/unloading position B**3**, the operator in the third operator's cab **35** work rear oriented; there is a driver within every the fourth operator's cab **38**, the driver is responsible for the driving of the cargo carrier **25** and operating the second carrying board **27** to move the container **24** from/to the central loading/unloading position B in the cabin **26** to/from the front and back of the cabin **26**.

For facilitation of the operators' talking, data transmission, video monitoring and control right transfer, the loading/unloading ports **5**, the first operator's cab **8**, the second operator's cab **75**, the control cab **35** and driving cab **38** are equipped with network communication devices; The position and condition of the operation and process of the trolleys **9** hoisting the container **24** can be seen on the screen in the loading/unloading port **5** and the third operator's cab **35**, the control of the trolleys **9** can be exchanged between the loading/unloading port **5** and the third operator's cab **35**.

A loading/unloading ports **5** in sidewalls **4** of the aircraft carrier, and in sidewalls **76** of the replenishment oiler, the ports **5** on the left side of the aircraft carrier and the replenishment oiler are the container loading/unloading ports **5**, and the ports **5** on the right side of the aircraft carrier and the replenishment oiler are the oil loading/unloading ports **5**, The loading/unloading port **5** is on the flange parts of the ship where the waves are small while sailing and the ship deck dangles wide. The first carrying board **6** within the loading/unloading port **5** is higher than the highest waterline of the aircraft carrier+high degree of the flange of the cargo carrier **25** covering above sea level **31**. The structure and size of the loading/unloading port **5** in aircraft carrier and the replenishment oiler are same.

There is a left and right setting runway **3** above the container loading/unloading port **5**, there is a crane arm **2** in the runway **3**, the crane arm **2** is a rectangle frame, the crane arm **2** driving by the power in container loading/unloading port **5** sliding in the runway **3** can be stretched out and in the loading/unloading port **5**, the outer end of the crane arm **2** is lifted by two ropes **19**, the other end of the two ropes **19** is fixed on the hull by hoist scaling to stretch. There is a trolleys **9** which can move and arrive at the inside/outside the loading/unloading port **5** on the crane arm **2**, the below of the four corners of the rectangular trolley **9** are pulled to the sling **10** by four fourth wire ropes **11**, fourth wire rope **11** is drove by the windlass on the trolley **9**, there are two vertical guide sliders **30** inside the trolley **9**, every guide sliders **30** has a runways **39**, there are two slide blocks **28** in the up end of slings **10** embedded within two runways **39** respectively, slings **10** can slide up and down on a runways **39**, slings **10** slides down at the loading/unloading position A and B relying on its own gravity and makes the spin lock **29** accurately inserted into the lock hole **23** of container under the guide of the guide slider **30**. After the spin lock **29** lock the lock hole **23**, the sling **10** pulls upward the container **24** by four fourth wire ropes **11**. There is a first operator's cab **8** in the container loading/unloading port **5** which hung to the trolley **9** can move on the crane arm **2** and arrive at the outside of the loading/unloading port **5**, the first operator's cab **8** is using for carrying the operator to the nearby the cargo carrier **25** to connect the oil pipe **7** to the oil tank **48** and the oil tank **71**. There is a crane arm **77** which can extend outward installing in the runway **78** in the oil loading/unloading port **5**, there is a second operator's cab **75** hanging outer side the crane arm **77**, the second operator's cab **75** is using for carrying the operator to the nearby the cargo carrier **25** to connect the oil pipe **7** to the oil tank **71**. There are many oil pipes **7** within the first operator's cab **8** and the second operator's cab **75** using for different fuel loading and unloading, its outer end interface is different specification corresponding to different oil hold tank interface, the inner port connects to different oil tanks within the Cabin.

After four rings **22** in the cargo carrier **25** are hooked by four hooks **21** of the marine lifting unit and four marine crane,

the crane arm **2** and the crane arm **77** stretch out from the loading/unloading port **5**; after the crane arm **2** and the crane arm **77** holding back from the loading/unloading port **5**, the four hooks **21** of the marine lifting unit and the marine crane separate from the four rings **22**.

Two first carrying boards **6** in tandem in the loading/unloading port **5** move forward and backward and transport the container **24** from/to the loading/unloading position A to/from the cabin of aircraft carrier and the replenishment oiler.

The third operator's cab **35** in the aircraft carrier is lifted by the crane **34** to slide toward outside and inside on the runway **33** and get into the window **32**.

On both sides of the aircraft carrier, there is respectively a marine lifting unit above the outside of the loading/unloading port **5** of the aircraft carrier, beneath the aircraft carrier's deck **1**, the marine lifting units are used to hang and secure the cargo carrier **25** in the sea; the dangling ship deck outside the loading/unloading ports **5** is narrow, the slide frame **36** on the right side of the marine lifting units can be telescopic and slide to the outside edge of deck **1**.

On each of a gantry's column of a replenishment oiler's first gantry **86** and a second gantry **45**, there is respectively a marine crane to hang and secure the cargo carrier **25** in the sea and to lifting the empty cargo carrier **25** from/to the sea to/from a first position **81** or a second position **84** on the replenishment oiler's deck.

Each marine lifting unit in the aircraft carrier or each marine crane in the replenishment oiler has four hydraulic arms, there is a hook **21** in the bottom of every hydraulic arms. The Four hydraulic arms in the marine crane are installed under the four corners of gantry **74**. Below the front slide frame **36** of marine lifting unit installs two sets of hydraulic arm, installs two sets of hydraulic arm below the back slide frame **36**, the distance between the hooks **21** of two hydraulic arm below the same slide frame **36** is same as between two rings **22** from left to right on the cargo carrier **25**, the distance between the hooks **21** of two hydraulic arm in tandem below the slide frame **36** is same as between two rings **22** in tandem on the cargo carrier **25**, cargo carrier **25** are hooked and stabilized depend on the four hooks **21** hook the four rings **22** in the four corners of the cargo carrier **25**, the slide frame **36** is driven which sliding in the slide **18** in the direction of inside and outside.

There are two hydraulic cylinder in one set of hydraulic arm, the hydraulic cylinder **17** is in the back, its upper end is connected with the joint axle **12** in the slide frame **36** and gantry **74**, its bottom is a square plate **20**, as shown in FIG. **5**, it connects the hooks **21** by a cardan joint **41** under the square plate **20**, the mouth of the hooks **21** is backward; the hydraulic cylinder **15** is in the front, its upper end is connected with the joint axle **16** of the slide frame **36** or the gantry **74**, its lower end is connected with the joint axle **14** at the back of the hydraulic cylinder **17**; the end of two hydraulic cylinder **17** at the same line is connected and fixed by stick **13**. The hydraulic cylinder **15** and hydraulic cylinder **17** working together can make the hooks **21** rise, fall, swing back and forth to hook rings **22** and rise and fall the cargo carrier **25**. Hook mouth locking plate **42** is driven by the hydraulic cylinder **37**, hook mouth locking plate **42** locking with the hooks **21** can prevent the rings **22** come off. There is respectively a tension springs **40** in the front, back, left and right of the square plate **20**, the other end of the four tension springs **40** is connected with the hooks **21**, the four tension springs **40** is using for buffering the impact to the hooks **21** in the horizontal and vertical direction while hooking the rings **22**. There are pressure springs **88** and pressure springs **89** between the square plate **20** and the cardan joint **41** which is using for buffering the impact to the hooks **21** in the vertical direction while hooking the rings **22**. **87** is the shaft lever of pressure springs **88** and pressure springs **89**, **90** is tension spring **40**'s hang hole hanging on the square plate **20**, **91** is tension spring **40**'s hang hole hanging on the hook **21**, **92** is display lamp where hook **21** is behind.

When working, the front two hydraulic cylinders' hook **21** of the marine lifting unit or marine crane hook the front two lift rings **22** of cargo carrier **25** and lock them with lock bar **42**. Then, the latter two hydraulic cylinders' hook **21** hook the latter two lift rings **22** and lock them with lock bar **42**.

In the each of the four gantry's columns of the replenishment oiler's first gantry **86** and second gantry **45**, there is a first windlass **58**, the two first windlasses **58** on the same side are fixed on the same shaft, driven by the same motor; the gantry frame arm **61** of marine cranes sway around the shaft of a second windlass **59** between the highest and lowest position as a supine position make by the self gravity of the marine cranes on both sides of the replenishment oiler and the first windlass **58**'s pulling the second wire rope **57**.

In one gantry frame arm **61**, there have two second windlasses **59** in tandem and are fixed on the same shaft, driven by the same motor; two first wire ropes **56** front and rear round the first pulley **55** and the second windlass **59** several times in the same way and are fixed with one point on the second windlass **59** and then are connected to the slide frame **63**'s inside and outside ends to become closed loop. The slide frame **63**'s two front and rear frame bars are in front and rear frame bars' medial grooves of the gantry frame arm **61** and first wire ropes **56** pulls slide frame **63** to slide in front and rear frame bars' medial grooves of the gantry frame arm **61** driven by the second windlass **59**.

The line between the fourth pulley **68** and the second pulley **65** and the line between the first pulley **55** and the second windlass **59** are parallel. The shaft **70** connects the two movable frames by the axes of frame **62** and slide frame **63** in front and rear direction. The front and rear two third wire ropes **60** round the second windlass **59** several times in the same way and the end is fixed on the second windlass **59**. The another end of the third wire rope **60** rounds second pulley **65**, the fourth pulley **68**, the fifth pulley **69** starting from the second windlass **59** and round the sixth pulley **72** to return back and round the fifth pulley **69** again, then is fixed on the shaft of the fourth pulley **68**, the third wire rope **60** ties two ends of the shaft of the sixth pulley **72** to reduce bending on frame **62** which is produced by the weight of cargo loaded on gantry **74**. The fifth pulley **69** is the double pulleys. The shaft from bar **66** near one side of the second pulley **65** to the first windlass **58** can be fixed by third wire rope **60** to prevent the bar **66** from breaking off.

The third wire rope **60** is driven by the second windlass **59** and can stretch in equal length with the first wire rope **56**. The second windlass **59** drags the first wire rope **56** when rotating in one direction, driving slide frame **63** and frame **62** slide inward, making the third wire rope **60** and the first wire rope **56** stretch synchronously; the second windlass **59** drags the first wire rope **56** when rotating in adverse direction, the first wire rope **56** slides outward around the first pulley **55** with slide frame **63** and frame **62**. Frame **62** pulls the third wire rope **60** and the first wire rope **56** to stretch synchronously. The inside and outside bar of frame **62** are respectively the fourth pulley **68** and the sixth pulley **72**'s shafts. The outside bar of slide frame **63** is the fifth pulley **69**'s shaft.

Gantry **74**'s central axis in front and rear direction is fastened into movable connection by outside aciform frame bar of frame **62**. Gantry **74** can swing around the shaft of the sixth pulley **72**. There is a brake **64** between gantry **74** and frame **62**

to prevent gantry **74** from continuing swinging relative to frame **62**, the brake **64** pivots the shaft of the sixth pulley **72**, and its braking disc is fixed on gantry **74**, and its braking caliper is fixed on frame **62**. There is a control cab **35** in the front end of gantry **74**.

Cargo carrier **25** can be moved to the loading/unloading position B by two slide frames **36** when four hooks **21** on a marine lifting unit catch four rings **22** on the cargo carrier **25**; cargo carrier **25** can also be moved to loading/unloading position B by slide frame **63**'s sliding and gantry frame arm **61**'s swinging when four hooks **21** on a marine crane catch four rings **22** on the cargo carrier **25**.

When the gantry frame arm **61** is in vertical upward position, the sliding of slide frame **63** has the function of going up and down, when the gantry frame arm **61** is in horizontal level, the sliding of slide frame **63** has the function of sliding inward and outward, when the gantry frame arm **61** is in the position between vertical upward and horizontal level, slide frame **63** slides slant.

There are four cargo carriers **25** shuttling between the aircraft carrier and the replenishment oiler, among which three's cabin **26** are fixed tank **71**, the other one's cabin **26** is suitable to carry both three movable oil tanks **48** or 2 layers of containers **24** placed up and down, the containers of each layer are arranged in three rows from left to right and in three lines from front to back. The size of container **24** is standard container **20'**, the length of an oil tank **48** is a container's length, and the width of an oil tank **48** is about three containers' width, the height is two containers' height. Oil tank **48** can be in mixed shipment with containers **24** and containers **24** must be put in the middle of cargo carriers **25** when mixed shipment.

The second carrying board **27** at the bottom of cargo carriers **25**'s cabin **26** can move forward and backward controlled by driver in cargo carriers **25** which is made of lightweight and high strength materials.

There is respectively one ship carrying board **67** on both sides of the replenishment oiler's deck, ship carrying boards **67** can transport a cargo carrier **25** from/to first position **81**, second position **84** between the first gantry **86** and the second gantry **45**, to/from fourth position **80** and third position **83** between second gantry **45** and third gantry **82**. There is respectively an empty cargo carrier **25** to fix oil tank **71** on third position **83** and second position **84**. There is an empty cargo carrier **25** to fix oil tank **71** on fourth position **80**. There is an empty cargo carrier **25** transporting containers **24** on first position **81**. If you want to change the position of cargo carriers **25** on fourth position **80** and first position **81**, the positions of two cargo carriers **25** can be changed after hanging them in the sea. Movable tank **48** and container **24** can be mixed loaded in cabin **26**.

On both sides of the middle part of fixed oil tank **71**, there is a connector connecting oil pipe **7**. On the front and rear side of right side of movable oil tank **48**, there is a connector connecting oil pipe **7**.

Above the central position **79** between second gantry **45** and third gantry **82**, and between fourth position **80** and third position **83**, there is a suspended movable oil tank **48**'s shelf **44**, the shelf **44** is slightly higher than the cargo ship **25**'s margin placed on deck. Above the shelf **44**, there is a crane **53** which can be driven to slide on the left and right on second gantry **45** and third gantry **82**. On the crane **53**, there is a trolley **54** sliding forward and backward. Under the trolley **54**, there is a sling **52**. Trolley **54** and sling **52** are connected by two fifth wire ropes **51** rolled synchronously by windlass. Under the sling **52**, there are two hooks **50**. When it comes to use the cargo carrier **25** for loading containers **24** to ship fuel, empty movable oil tanks **48** on the position **44** can be shipped to cabin **26** of cargo carrier **25** on fourth position **80** by crane **53**, or empty movable oil tank **48** in cabin **26** on cargo carrier **25** on fourth position **80** can be shipped on shelf **44**. There can be put three or four movable oil tanks **48** on shelf **44**. **85** is direction arrow that cargo carrier **25** be moved on the deck.

In order to keep the aircraft carriers and the replenishment oiler in the steady state, the operation of the marine lifting unit and a marine crane for loading and unloading of goods and materials on both sides should try to go on simultaneously.

Abeam replenishing rig on existing replenishment oiler's gantry can be still existed, **43** is an abeam replenishment oil pipe.

When starting replenishing, two sides of the gantry frame arm **61** hang vertically cargo carrier **25** on first position **81** and second position **84**. The two operators in control cab **35** of the replenishment oiler respectively operate the second windlass **59** to drag the first wire rope **56** in order to make slide frame **63** slide upward in front and rear frame bars of the gantry frame arm **61**, thus rising frame **62**, gantry **74** and cargo carrier **25**, operate the first windlass **58** to release the traction of the second wire rope **57** for the gantry frame arm **61** leaning gravity gantry **74** and the gravity of cargo carrier **25** swing in infer lateral direction to the horizontal position, then operate the second windlass **59** and the first windlass **58** to move cargo carrier **25** to loading/unloading position B, hook **21** is not separated from the cargo carrier **25**'s ring **22**. After cargo carrier **25** arrives at loading/unloading position B, inform operators in loading/unloading ports **5** of two sides respectively of handling the arm of the crane arm **2** and crane arm **77** out to the loading/unloading ports **5**; inform driver in cargo carrier **25** of moving the second carrying board **27** to the middle of cabin **26**. Operator in container's loading/unloading ports **5** presses loading/unloading position A command key, inward sliding command key, falling command keys, locking command keys and rising command key to make container **24** suspend on the loading/unloading position A from loading/unloading position A by trolleys **9** and slings **10**, then presses outward sliding command key and the first carrying board **6** comes back to the cabin of the replenishment oiler. After the operator in control cab **35** takes over the operational control, presses B**3** command key, falling **1** command keys, unlocking command keys, lifting command key and loading/unloading position A command key to put the container **24** on the second carrying board **27**'s B**3** and sling **10** rises. The trolley **9** comes back to loading/unloading position A. After staff in cabin of the replenishment oiler putting another container **24** on the first carrying board **6**, operator in loading/unloading port **5** presses inward sliding command key, the first carrying board **6** moves container **24** in cabin of the replenishment oiler to loading/unloading port **5** for the preparation of the second container **24**'s shipment. The operator in control cab **35** first fills the lower layer, then fills the upper layer of container **24** on the second carrying board **27** according to the sequence of B**3**, B**2**, B**1**. After the second carrying board **27** is full of containers **24**, drivers move the second carrying board **27** back to the original position, and move the another second carrying board **27** to the middle of cabin **26**, after fill the container **24** according to the same order, move the second carrying board **27** to the original position, finally in the middle bottom of the cabin **26**, fill the container **24** according to the same order. When loading and unloading oil, the operators of two loading/unloading ports **5** respectively ride and operate operations cabs **8** and operation cabs **75**, moving to near cargo carrier **25** to connect respectively oil delivery pipes **7** in the two loading/unloading ports **5** to oil tank **71** or oil tank **48** on two cargo ships **25** for loading

oil. The first operator's cab **8** is hanging on the trolley **9**, following trolley **9** for moving near to cargo carrier **25**. After the loading, the operators in two loading/unloading ports **5** respectively stretch crane arm **2** and crane arm **77** back to loading/unloading ports **5**. The operators in two control cabs **35** operate marine crane to put cargo carrier **25** completely into the sea, unlock lock bar **42**, separate the rear two hooks **21** and ring **22**, then separate the front two hooks **21** and ring **22**. The operator in control cab **35** informs drivers of setting sail, the driver drivers cargo carrier **25** to the aircraft carrier.

The operators in two control cab **35** operates respectively both sides of replenishment oiler marine crane's gantry frame arm **61** erect, the workforce in the replenishment oiler moves the cargo carrier **25** on ship carrying board **67** from fourth position **80** and third position **83** to first position **81** and second position **84**. The operators in two control cabs **35** hang cargo carrier **25** in the sea and move to B, then unload the oil.

When cargo carrier **25** drives near the aircraft carrier, operators in two control cabs **35** of the aircraft carrier operate respectively two hydraulic arms on the front of the marine lifting units on the two side to cooperate with the drivers in driving cab **38** to hook two rings **22** on the front of the cargo carrier **25**, then to operate respectively two hydraulic arms on the back of the marine lifting units to hook two rings **22** on the back of the cargo carrier **25**, Lock ring **22** with a lock bar **42** and move the cargo carrier **25** to the loading/unloading position B. After cargo carrier **25** moves to the loading/unloading position B, operator in control cab **35** informs operators in two loading/unloading ports **5** respectively stick the crane arm **2** and crane arm **77** out of the loading/unloading ports **5**; the operator in control cab **35** respectively press B**1** command key, falling **2** command keys, locking command keys, rising command key and loading/unloading position A command key to move the trolley **9** and sling **10** to B**1** and decline, lock and suspend the second layer of container **24** on the second carrying board **27** and move to the loading/unloading position A. After the operator in loading/unloading ports **5** took over the operational control, press falling command key, unlock command key, lifting command key, outward sliding command key, position B**1** command key, the trolley **9** unload container **24** and want back to position B**1**. After the container **24** are unload completely from the cargo carrier **25** to unload empty container **24** from container loading/unloading ports **5** to cargo carrier **25**. The sequence of unloading is the same as the sequence of unloading container **24** from the replenishment oiler to cargo carrier **25**.

The order of unloading containers **24** from cabin **26** is: first unload the three containers **24** in the upper layer of second row, the discharge of the order is: B**1**, B**2**, B**3**; and unload container **24** in the below layer of second row in the same order, After the second carrying board **27** moving the container **24** in front and rear rows to the second row of cabin, unload container **24** in the same order.

In order to strengthen the stability of container **24** in cabin **26**, we can connect the two layers of container **24** with controllable spin lock, the lowest layer of the container **24** can be connected with the second carrying board **27** and the bottom board of cabin **26** by controllable spin lock.

During the loading of three movable oil tanks **48**, they can be connected by communicating pipes, the total joint after connecting associated with the oil pipe **7** is on the movable oil tank **48** in the middle of cabin **26**. The highest speed of sailing about cargo carrier **25** is significantly faster than the speed of aircraft carriers and the replenishment oiler, so that we can catch the aircraft carriers and the replenishment oiler which are sailing.

In front of ring **22** is the display light for operation at night. Main propulsion propeller and rudder are in the rear cargo carrier **25**. Second rudder and second propeller for adjusting driving direction of cargo carrier's head can be put in the front of the central cargo carrier **25**. On both sides of the cargo carrier **25** are bump rubber. Cargo carrier **25** is designed to wave piercing catamaran, so cargo carrier **25** can run more stably.

In order to reduce the height of the marine lifting unit in the aircraft carrier, the fixed frames can be increased between the below of deck **1** of the aircraft carriers and the marine lifting unit.

There is a video camera downward on trolley **9** for observing the loading and unloading of container **24** by control cab **35**'s operators.

The invention claimed is:

1. An aircraft carrier replenishment system designed to transport cargo using containers and oil tanks, wherein comprising: A. loading/unloading ports in sidewalls of the aircraft carrier and in sidewalls of the replenishment oiler, the ports on one side of the aircraft carrier and the replenishment oiler are the container loading/unloading ports, which are used to load/unload containers and oils, and the ports on the other side of the aircraft carrier and the replenishment oiler are the oil loading/unloading ports which is used to load/unload oils specially; inside the container loading/unloading ports, there is a container crane which can move and arrive at the outside the container port along a runway, and a first operator's cab hung to the container crane to the outside of the loading/unloading port, the container crane comprises a crane arm, a trolley and a sling, the trolley lifts the sling by four fourth wire ropes which are driven by a windlass, the trolley runs on the crane arm, the sling carries the container and transports the container from/to at least one first carrying board on the loading/unloading position inside the loading/unloading port to/from the cargo carrier secured to the loading/unloading position; inside the oil loading/unloading port, there is a second operator's cab hung on an outer side of a crane arm which can move along a runway and arrive at the outside of the oil loading/unloading port, both the first operator's cab and the second operator's cab can approach a side of the cargo carrier and connect an oil pipe to the oil tank or to the oil tank to load/unload oils; inside the container loading/unloading port, a plurality of first carrying boards can slide forward and backward to move the containers from the loading/unloading position in the loading/unloading port to the cabin of the replenishment oiler and the aircraft carrier, or to move the containers from the cabin of the replenishment oiler and the aircraft carrier to the loading/unloading position in the loading/unloading port; B. on each sides of the aircraft carrier, there is respectively a marine lifting unit which is beneath the aircraft carrier's deck above the outside of the loading/unloading port of the aircraft carrier, the marine lifting units are used to hang and secure the cargo carrier in the sea; on the left side and the right side of a gantry's column of a replenishment oiler's first gantry and a second gantry, there is respectively a marine crane to hang and secure the cargo carrier in the sea and to move the empty cargo carrier from/to the sea to/from a first position or a second position on the replenishment oiler's deck; each marine lifting unit or marine crane has four hydraulic arms, and each of the four hydraulic arms has two hydraulic cylinders, cylinder and cylinder, a higher end of the cylinder is connected to the front end of the slide frame and a higher end of the cylinder is connected to the back end of the slide frame, or a higher end of the cylinder is connected to the front end of the gantry and a higher end of the cylinder is connected to the back end of the gantry, and a lower end of the

cylinder and a lower end of the cylinder are connected with each other, there is a hook at the lower end of the cylinder, the hydraulic cylinder and the hydraulic cylinder work together to move the hook forward, backward, upward and downward; each said marine lifting unit has two slide frames and two runways, a left and right hydraulic arm beneath each slide frame, wherein the slide frame is driven inward/outward along the runway; each marine crane also comprises a gantry frame arm, a frame, a slide frame, a gantry, a first windlass, a second windlass, a first wire rope, a second wire rope, a third wire rope, a first pulley, a second pulley, a third pulley, a fourth pulley, a fifth pulley and a sixth pulley; wherein one end of the gantry frame arm is fixed to the shaft of the second windlass, the other end is secured to the second wire rope driven by the first windlass and sways between the highest and lowest luffing position; the frame and the slide frame are tied together by a shaft into a cross shape movable connection, the first wire rope winds around the first pulley and the second windlass plural times and connects to one point on the second windlass and then connects to the inner end and the outer end of the slide frame respectively to form a closed cycle which is pulled by the first wire rope and driven by the second windlass, the slide frame driven by the first wire rope can slide in a front bar and a rear frame bar of the gantry frame arm, the third wire rope is driven by the second windlass and can stretch in equal length with the first wire rope, the third wire rope winds around the second pulley, the fourth pulley, the fifth pulley, and the sixth pulley, returns back and winds around the fifth pulley, then are fixed to a shaft of the fourth pulley, the third wire rope ties two ends of the shaft of the sixth pulley so to reduce bending moment on the frame which is produced by the weight of cargo loaded on gantry; a shaft shaped frame bar outside the frame is tied to the upper of the central point of the gantry via a movable connection, each of the four hydraulic arms is provided under each of the four corners of the gantry, the four hydraulic arms form a rectangle; the distances between four hooks at ends of the four hydraulic arms of the marine lifting unit or the marine crane are equal to the distances between four lift rings at four corners of the cabin; wherein the cargo carrier can be moved to the loading/unloading position by two slide frames when four hooks on the marine lifting unit catch four rings on the cargo carrier; the cargo carrier can also be moved to loading/unloading position by moving the slide frame and swinging the gantry frame arm when four hooks on the marine crane catch four rings on the cargo carrier; C. there are four cargo carriers shuttling between the aircraft carrier and the replenishment oiler to transport cargo, three of the four cargo carriers have cabins for fixed tanks which are dedicated to transporting oils; one of the four cargo carriers includes the cabin which is suitable to carry three oil tanks or carry 2 or 3 layers of the containers placed up and down, the containers of each layer are arranged in three rows from left to right and in three lines from front to back; at each corner of the cabin, there is a ring; at the bottom of the cabin, there are two second carrying boards for moving the containers from the loading/unloading position at the central part of the cabin to the front part or the rear part of the cabin; D. there is a control cab in front of the marine lifting unit, and a control cab in front of the gantry on the marine crane; the control cab can be used to lift the cargo carrier using the marine lifting units or the marine cranes; for facilitation of the operators' talking, data transmission, video monitoring and control right transfer, the loading/unloading ports, the first operator's cab, the second operator's cab, the control cab of the aircraft carrier and the replenishment oiler and driving cab are equipped with network communication devices; E. there is respectively one ship carrying board on each of the two sides of the replenishment oiler's deck, the ship carrying boards can transport the cargo carrier between the first position, the second position, and a third position, a fourth position; there is a shelf used to store movable tanks between the second gantry and third gantry, and between the fourth position and the third position, and above the shelf, there is a crane which is movable rightward and leftward between the second gantry and the third gantry, there is a trolley on the crane, which can move forward and backward, the trolley carries two windlasses driven fifth wire ropes which can lift and lower a sling, and the sling has two hooks at the end to carry the rack of the movable tank; the crane is used to move the empty movable tanks from the shelf into the cabin of the cargo carrier at the fourth position or transport the empty movable tanks from the cabin of the cargo carrier at the fourth position to the shelf.

2. The aircraft carrier replenishment system designed to transport cargo using containers and oil tanks according to claim **1**, wherein there are two downward guides inside the trolley, and there is a runway on each of the two guides at top of the slings, there are two slide blocks which are embedded in the two runways respectively, the slings run along the runway up and down; when the containers are loading/unloading, the cargo carrier is lifted and moved above the loading/unloading position, and the trolley runs to the loading/unloading position, then the slings guided by the guide to fit a spin lock into a lock hole in the container precisely.

3. The aircraft carrier replenishment system designed to transport cargo using containers and oil tanks according to claim **1**, wherein there is a lock bar driven by a hydraulic cylinder at the mouth of the each hook, the lock bar can block the mouth of each hook to prevent loosing ring; the square plate is at a lower end of the underneath hydraulic cylinder, there is a cardan joint under the square plate which connects the hydraulic cylinder and the hook, around the square plate, there are four tension springs which connect the hook at one end, the tension springs are used to absorb horizontal and vertical impacts on the hook during lifting of the ring; there are a first compression spring and a second compression spring between the square plate and the cardan joint to absorb vertical impacts on the hook produced by the ring.

4. The aircraft carrier replenishment system designed to transport cargo using containers and oil tanks according to claim **1**, wherein there is a brake between the gantry and the frame to prevent the gantry's continue swinging motions relative to the frame, the brake rotates around the shaft of the sixth pulley, and its braking disc is fixed on the gantry, and its braking caliper is fixed on the frame.

* * * * *